STRATEGIES FOR USING INTERNATIONAL DOMAIN STANDARDS WITHIN A NATIONAL CONTEXT: THE CASE OF THE DUTCH TEMPORARY STAFFING INDUSTRY

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ABSTRACT

This paper will discuss strategies for using international domain standards within a national context. The various strategies are illustrated by means of a case study of the temporary staffing industry.

Keywords— Standard, Profiling, Interoperability

1. INTRODUCTION

Strategies for using international domain standards in a national setting may vary in their respective goals. Whereas one strategy is mainly aimed at achieving international interoperability, a second strategy may be geared towards efficiently setting up a new (national) standard while making re-use of the international standard. Other strategies combine the re-use aspect of available standards with goals of international interoperability. The concept of "localisation" is often used for adding specific local/national aspects as an extension to the international standard. At the same time, these localisations are often misused for adding more than just local aspects. This makes localization an easy way to adapt the standard to specific needs, but in most cases, it has a negative impact on interoperability and the quality of the standard. The various strategies are illustrated by using a case study of the temporary staffing industry. The international domain standard HR-XML is being used worldwide and uses the concept of localization for adding specific local (or national) needs. Within the Netherlands, the SETU (Foundation for Electronic Transactions within the Temporary Staffing Industry) standard has been developed based on this international standard and has been released in the first quarter of 2008. The SETU specifies guidelines for using the international standard for human-resource related information exchange HR-XML in a Dutch context [1].

2. STRATEGIES FOR STANDARDS

Standards as well as specifications are terms that cover a broad range of subjects. Without standards our daily lives would be completely different from our current lives. We need only think of everyday use of standards for electricity, the standards system for distance metrics, the standards and specifications used in building housing constructions, etc. The same applies to standards in the context of information technology: these are quite necessary and crucially important for systems and organisations to be interoperable. This chapter shortly describes the differences in terms used when discussing standardization, not so much from a formal definition point of view, but based on colloquial terms in a standardization environment. Based on this description, decision factors for selecting standards are discussed, followed by strategies for using standards in a specific context.

2.1. Submission methods

Various definitions exist for the terms standard and specification. In this paper, we will use the term specification for a document that contains a detailed description of a problem domain. A norm is often used to describe a specification document with a formal status. It derives its status from a formal standardization body (e.g. CEN/ISO) after going through a formal process of ratification. We use the term norm to describe a product that contains a specification, but may also include guidelines, best practices or sets of criteria for certification. A norm that is ratified by formal bodies is also often called a standard. However, in our opinion, the term standard usually has a more practical connotation. Generally speaking, a norm that is not used in practice is seldom called a standard. A norm can become a standard if it is used in practice and on a sufficiently large scale.
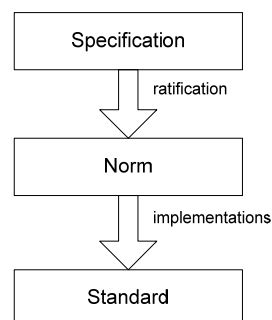

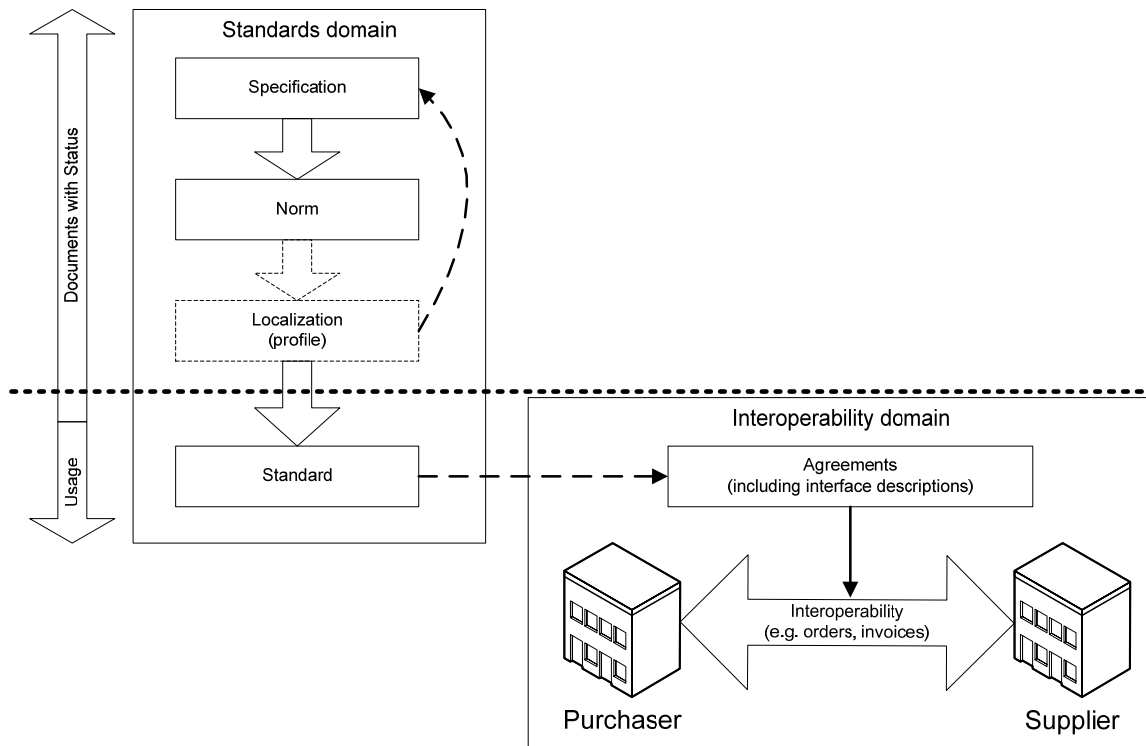**Figure 1 - Relation between specification, norm and standard**

Figure 2 - Use of standards to support interoperability

We can discern a wide variety of terms that apply to the term standard: open standards, defacto standards, proprietary standards, technical standards, document standards, organisational standards, semantic standards, vertical standards, domain or sector standards, etc [2]. All of these terms describe a subset of the standards family. The terms vertical [3], sector or domain standard are all related. The domain can be an industry/sector; for instance the temporary staffing industry, but also the domain of certain country: for instance the temporary staffing in the Netherlands. In the remainder of this paper we will turn our attention to domain standards. In general, standards should be specific enough (see chapter 2) for organisations to use them, which means that standards should deal with domain specific characteristics. A certain level of complexity is added to domain standards with the introduction of "localizations" or "profiles". In the context of this paper, we refer to a profile as an addition to the specification, describing how to use the specification in a certain 'local' context. The profile also often adds semantics of a specific industry/domain to a more general specification. The phrase semantic domain standards is often employed, when referring to the standard that includes such profiles. This profile may sometimes be or become a specification in its own right. In other cases its details are handed back to the standardisation body to be included in the formal, general specification or norm. Different strategies for dealing with profiles in relation to the original specification and norm exist (cf. section 2.3). This paper deals specifically with domain standards with a focus on semantics, but most statements will hold for other type of standards as well. All standards have in common that they are a means to reach the goal of interoperability. The implementation of standards should never be a goal in its own right, but should always serve the higher level goal (or business need) of attaining interoperability. In order to do business, organizations make agreements about prices for products or services, service levels, etc., but also about interfacing with each other. An agreement related to the (IT) interface is a bilateral agreement (contract) that will contain specifications that detail how systems will be able to interconnect. Organizations may decide to draw up a new specification for this particular interconnection, but the agreement may also refer to a standard for this purpose. This standard will thus serve to solve the issue of interoperability between those organisations. The EIF uses a three layer model for interoperability containing organisational, semantic and technical interoperability [4]. Domain standards apply to all three levels of interoperability. However, as most interoperability problems are about semantics, this aspect of domain standards is of particularly high importance. Figure 2 graphically illustrates the role and use of standards in a business environment, in order to support and attain interoperability.

2.2. Decision factors for selecting standards

In practice, organisations have to choose standards for drawing up agreements with other organizations. Domain (standardisation) organisations too have to select the main standards specifications or norms they will base their profiles on. Selection of standards/specifications is a crucially important process that deserves much more

attention than it gets nowadays. The choice for a standard is a fundamental one: it represents a choice for years and when selecting the wrong standard, involves high switching costs. It is comparable to the selection of a software system. After a choice you may get dependent on the software vendor or service provider and in most cases the costs involved when changing the software system, are high. In most cases selecting one standard is not enough. The selection process often deals with selecting a breed of specifications. The selection is context specific and is affected by four factors as depicted in figure 3.
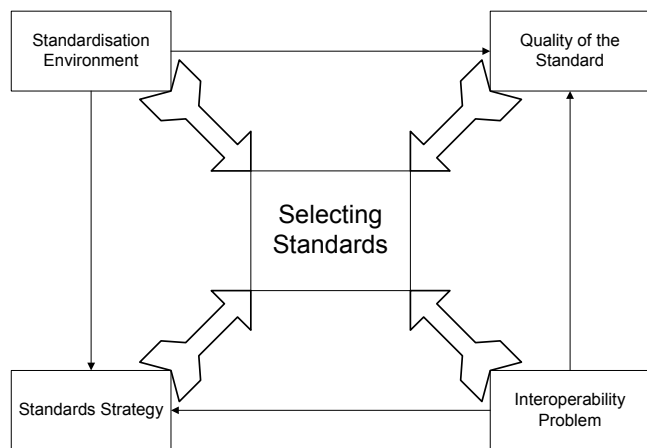

Figure 3 - Decision factors for selecting standards

Quality of the Standard

Not all specifications are of similar high quality, if we apply a set of quality characteristics [5]. Especially in the case of semantic standards it occurs that standards are not well documented, not understandable, not implementable, etc. Quality aspects are important criteria for selection and are manifold. Since they are outside of the scope of this paper, we will not further detail them here. Quality is related to the factors Standardisation Environment and the Interoperability Problem.

Standardisation Environment

Aspects regarding the standardisation body can be of influence. Openness of the organisation for instance, can make it easier to join and positively affects the possibilities of members to exert their influence on the resulting standard. This openness is also related to the quality of the standard: an open standardization environment potentially leads to higher quality standards, as feedback from all parties interested can be incorporated. Another example is the extent to which working groups within the standardisation body are actively working on the standard. The absence of an active community makes it seem less sensible to select that particular standard. Certification and software support are other characteristics of the standardisation environment that influence the decision to select a standard.

Interoperability Problem

A standard is (part of) a solution for an interoperability problem. A standard is sometimes dedicated to a specific interoperability problem and can under circumstances be applied to similar problems. The same standard will however not necessarily be a good solution to other interoperability problems. This implies that the selection of the standard is heavily dependent on the interoperability problem at hand. A hammer can not be used to solve all problems: sometimes a screwdriver provides a better solution to the problem.

Standards Strategy

The decision to use a particular set of standards is part of the internal strategy of an organisation. By using standards an organisation may lose some of its distinguishing characteristics as compared to other organisations. As long as this choice mainly involves the operation of back office processes like invoicing it may fit the company's strategy. For instance; if you are market leader and benefit substantially from creating a vendor lock-in situation with your customer, you may want to delay the development of a standard that applies to the (business) relation with that customer. The selection of the standard can be an instrument in executing a strategy of delay.

2.3. Strategies for adopting standards

In the previous paragraph we stated that the selection of the standards is influenced by the organisation strategy. This paragraph will elaborate on strategy aspects that are specifically related to the situation of domain standards. There are three well-known market strategies for adopting standards; these are the *embrace-and-extend*, the *embrace-and-omit* and the *embrace-and-adapt* strategy [6], [7]. All three strategies influence interoperability between organisations. The *embrace-and-extend* strategy is one of the most well known strategies. This strategy introduces additions to a standards implementation that are not compliant with the standard. This addition therefore interferes with one of the intentions of standards, which is making products interoperable. A real-world example of the *embrace-and-extend strategy* is the case of SGML and XML [8]. The *embrace-and-omit* strategy is based on omitting features that are part of the standard in the final product. As a result, the standard is not entirely implemented. This may cause problems in terms of interoperability, if another product or organisation assumes that everything specified in the standard, is present. The third and last well known strategy is the *embrace-and-adapt* strategy. In this approach an organisation implementing a standard introduces local adaptations or alterations to the implementation of the standard. Problems with interoperability may arise when these adaptations are not understood by other implementations. The Unified Modelling Language (UML) case is a real-world example of standard resulting from an *embrace-and-adapt strategy* [6]. When dealing with a standard for a certain domain, there is the option of choosing a standard and fully complying at one end or creating one's own standard/solution at the other end. In between these extremes, we can identify introducing profiles, extensions
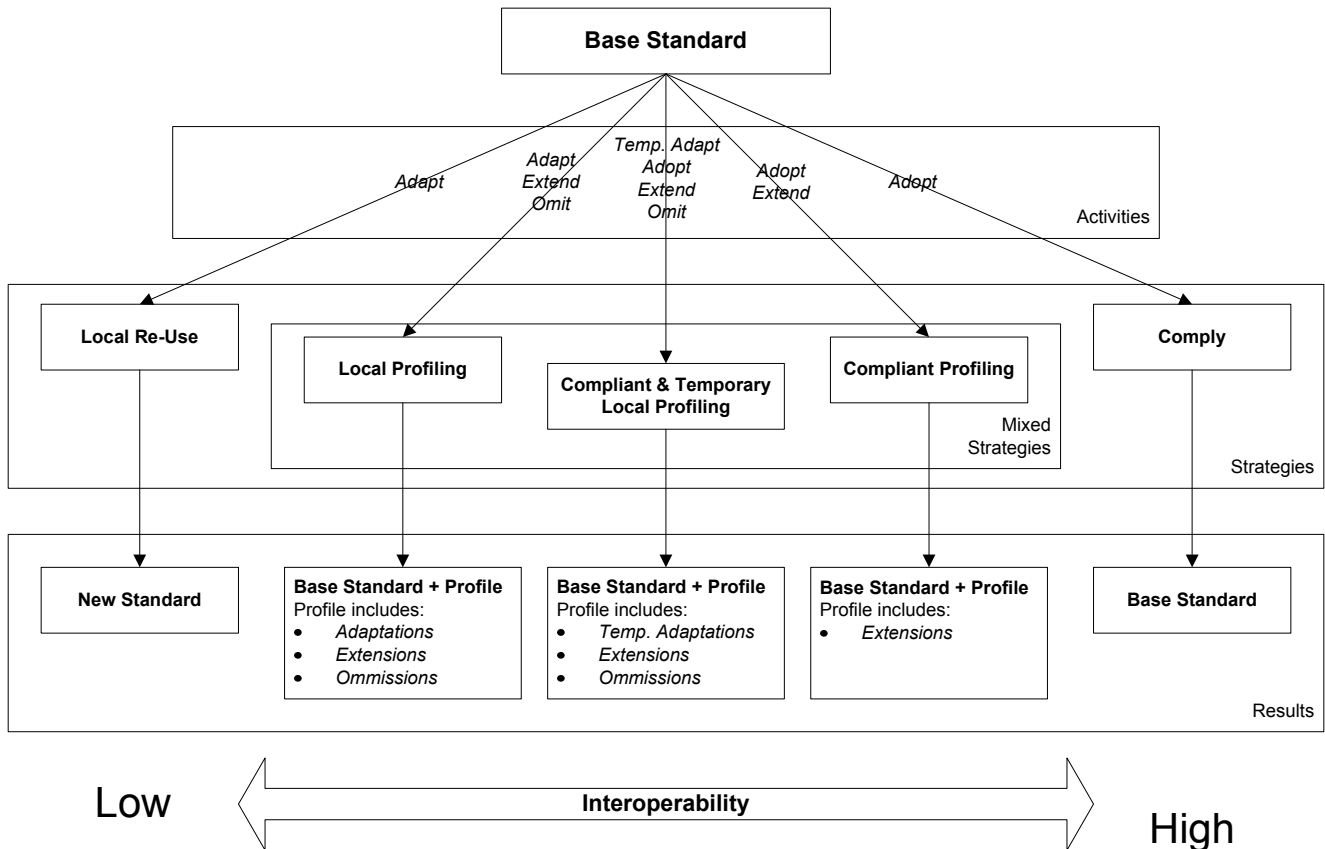
Figure 4 - Strategies, activities and results

to the original standard, as a means to cope with adoption of standards. We will refer to the introduction of profiles as the category of 'Mixed strategies'. Within this strategy category, a distinction is made between various options for dealing with the profile. For instance the compliant profiling strategy means only having allowed and justified extensions within the profile, while on the other hand the local profiling strategy may result in a profile consisting of everything one may want to include. Figure 4 details relations between strategies, activities and results. Based on the aforementioned strategy activities of extension, omission and adaptation, we have identified five strategies that we will discuss below: *Local Reuse, Local Profiling, Compliant & Temporary Local Profiling, Compliant Profiling* and *Comply*. All five of these strategies are related to dealing with adoption of a base standard in an organisation. Starting from a set of base standards, we have adapted and extended the strategies in [6], to include four activities that can be performed as part of the strategy. The following activities are listed:

- Adapt – meaning the base standard is adapted (no compliance)
- Adopt – meaning the base standard is adopted
- Extend – meaning the base standard is extended
- Omit – meaning part of the base standard is omitted

Strategy Local Re-Use

A standard can be created for a specific interoperability problem situation, regardless of existing standards targeting the same or similar problem(s). In the figure this is called the Local Re-Use strategy. To jumpstart the creation of a new standard, another standard is sometimes re-used and adapted. The end result is a new standard that is not interoperable with other implementations of the same base standard. As standards are a means for achieving interoperability this situation is far from ideal. The strategy is however easy to implement and involves relatively little expense in the short term. This strategy will only suffice for a local and isolated interoperability problem.

Strategy Local Profiling

The main focus of this strategy is to create a local implementation based on base standards, but instead of creating a new standard by re-using the base standard, in this strategy the base standard is kept unchanged while all adaptations will be part of the added profile. This means that the end result is the base standard with an additional profile containing adaptation to the base standard, as well as extensions and omissions to the base standards.

Strategy Compliant & Temporary Local Profiling

This strategy can be seen as a mix of both worlds. While on one hand the standard is being (temporarily) adapted, on the other hand the strategy deals with adopting the base standard by trying to improve the base standards as well.

Often when dealing with standards developers find errors or nuances (from business to technical) within the base standard. These can be solved within the profile (strategy Local Profiling), but for interoperability it would be better if these are being fixed or improved within the base standard. When adopting the base standard it is assumed that those items are forwarded to the community of the base standard. Unfortunately this process is often time consuming. A temporary adaptation of the base standard as part of the profile will provide a work around for the time being. The same holds for omissions; when in a certain context parts of the base standards should be omitted for achieving interoperability, it would be ideal to forward this request to the community of the base standards. Often it is impossible to wait until the base standard is changed; a description of a temporary omission within the profile is a workaround for the time being.

Strategy Compliant Profiling

The strategy Compliant Profiling implies that no adaptations related to the base standard will be used. However, it is often possible and allowed by the standard to have extensions to support the base standard within a certain context, for instance the context of a specific country. Other requests that are not specific to the context will be forwarded to the base standards community. The profile will be used as a "pure and intended" profile, which means that it supports only extensions specific to the local context and no (temporary) adaptations or omissions.

Strategy Comply

The strategy Comply means that full compliance to the base standard is the goal to achieve. Changes and support for local contexts is achieved solely by providing feedback to the base standards community. The end result is the use of the (improved) base standard, without profiles to suit specific local needs or requirements.

3. CASE TEMPORARY STAFFING INDUSTRY THE NETHERLANDS

3.1. The context: Standards for temporary staffing

Exchange and processing of data and information, such as electronic timesheets and invoices by electronic means, is expanding substantially within the staffing industry. An increasing number of organizations are experiencing the benefits of rapid processing, a decrease in the number of errors and lower costs when switching from traditional exchange of information on paper and from processes that are only partly digitalised. Standardization of electronic message formats is however essential for having interoperable solutions within the entire staffing industry. Both staffing organisations and staffing customers will benefit from interoperability by reducing ICT costs, avoiding lock-ins, and setting up efficient communication. SETU is a Dutch acronym for 'Stichting Elektronische Transacties Uitzendbranche', which translates to "Organisation for Electronic Transactions in the Staffing Industry". The SETU is a non-profit organisation that creates and maintains standards for exchange of electronic data in the Dutch staffing industry.

3.2. Standard selection

The desire to enhance efficiency in processing information and cut down on errors, has initially lead to a collective decision of digitalization of the information exchange in current staffing practices. The process of selecting a specific standard in the Netherlands, was in various ways influenced by the decision factors that were highlighted in section 1.2 .We will detail the specifics of each of these influences here:

Quality of the standard

As most of the stakeholders had limited experience with electronic (semantic) standards in this specific domain, quality aspects focussed more on content-specific criteria than on organisation related criteria. Two main drivers for selection of this standard were level of detail, and flexibility. Completeness was an important additional requirement, but as the initial outset of the case was strictly focussed on a specific part of the process of information exchange, viz. invoicing and exchange of timecard information, this requirement was somewhat more easily fulfilled. Because reuse of existing standards was an important part of the strategy, level of detail was required in order to be able to start off with a standard that befits at least a substantial part of the goals and provides detailed coverage of the staffing domain. The HR-XML SIDES standards provided enough level of detail to warrant adequate suitability. Flexibility was perhaps an even more important driver to selecting a suitable standard. The domain of staffing acknowledges more or less the same core concepts worldwide. Because of the nature of the topic, involving activities dealing with human resources, there are a lot of intricacies as laid down in laws and regulations that are specific to regional or national use and implementation. Because of the initial unfamiliarity with the contents of the standard, flexibility was paramount in choosing the standard. HR-XML SIDES specifications showed flexibility in providing enough options and headroom, tailoring to the needs of a (geographically) diverse set of users.

Standardisation environment

Although the standard had to serve a national purpose first and foremost, the nature of the stakeholders and their business activities did not permit a choice limited to national boundaries. The standardisation body involved in the standard to be selected had to have a more global appeal, if not in its own organisation then by virtue of the diversity of its subscribing members and participants. With activities starting to spring up in Europe, the US and Japan, HR-XML SIDES proved to be an eligible choice. Openness and short lines of communication added to the suitability of the organisation and its resulting standardization products.

Interoperability Problem

As mentioned before, the initial scope of the selection process was strictly and narrowly focussed, albeit it with a clear set of requirements for future adoption. Judging from readily available standards documentation and after a scan to determine its suitability to the problem at hand, HR-XML SIDES appeared to fit the bill. While only part of the set of standards was initially required, the remainder seemed to address future requirements and provide options to fulfil those requirements.

Internal Strategies

The adoption of a standard in this domain was a joint effort by some of the larger staffing companies in the Netherlands. It was readily recognized that customer lock-in with regard to the exchange of information was undesirable. It could eventually even prove to be harmful to business, when customers get to have their say in "standardizing" the information to suit their own purposes and needs. Although this required a shift in service proposition by at least part of the group of stakeholders, selection and eventually adoption of the HR-XML SIDES standard was not hindered by politics, as the benefits to all concerned were clearly considered to outweigh the disadvantages.

3.3. Strategies

The decision factors that have proven to be drivers for selection of the base standard, have in turn influenced the strategy to adopt the base standard for use in the staffing industry in the Netherlands. Subsequent paragraphs will detail our considerations regarding suitability of the various strategies to the goals of SETU.

Local Re-use

This strategy supports flexibility and provides level of detail as one sees fit. Based on HR-XML standards, the actions of adaptation would create a new standard to fully support the requirements of the Dutch staffing industry. An important feature of this strategy is the fact that it provides interoperability among those using the new standard. However, by using this strategy one disrupts interoperability on a more global scale. Standards resulting from other strategies in other (trans)national contexts, will present an interoperability problem. As operations and activities of the parties involved already extend beyond national borders, this was not deemed to be a viable strategy in the long run.

Local Profiling

Similar to the strategy of local re-use, the main focus of this strategy is to create a local implementation. The result of this strategy in general does not provide a readily identifiable common base of standards to support interoperability with other standards, because omissions and adaptations will disrupt interoperability with other standards, developed with or without local profiles or extensions. As with the strategy of local re-use, this strategy does not fit the requirement of international

interoperability and has not been selected for the activities of SETU.

Compliant & Temporary Local Profiling

Temporary profiling creates standards that have components that are only temporarily of a local and adaptive nature, i.e. they provide a transient phase from adaptation to adoption and compliancy. In order to adhere to the generic character of the standards and in order to avoid loss of interoperability, SETU has (partly) opted for this strategy. These were required nonetheless, as numerous requirements with respect to a staffing industry standard could not be met in the base standard or by mere extensions. Subsequently, feedback provided to the standards organisation members has on various occasions led to adaptation of the standards as a whole, leading to a shift from compliant and temporary local profiling with temporary adaptations to compliant profiles or even full compliancy.

Compliant Profiling

As more insight was gained into the details of the HR-XML SIDES standards and the decisions underlying its architecture, the addition of specifics lacking in the available base standards was necessary and apparent. The activities in other regions accelerated and supported the process of adopting and extending current standards by means of profile. As the HR-XML standards themselves provide options for local profiling, the strategy of compliant profiling was regarded as another fitting option for development of SETU standards (together with compliant and temporary local profiling).

Comply

This strategy requires full adherence to an (international) base standard. The HR-XML standard did not completely fulfil Dutch requirements with respect to level of detail and flexibility. Thus, changes and additions to the standard were required from the outset. Due to the uncertain outcome of the process of change submission for full compliancy and the options for local profiling being built into the standard, the strategy of compliant profiling was preferred, rather than striving for full compliancy. As mentioned above however, some of the results of profiling have in turn led to improvements and internationally accepted adjustments to the base standard. In the end, this improves compliancy of the SETU standards to a greater part of the HR-XML base standard.

3.4. Experiences

The initial goal of introducing the SETU standard was to transform exchange of invoicing and timecard related information from a paper process to an electronic version. Over time the activities of SETU have included adoption of HR-XML standards for ordering and selection processes in the staffing industry as well. During the process of adoption of the HR-XML standards in the Dutch context, the use of strategies of compliant and temporary local profiling have fitted the development cycles of both SETU and those of

the HR-XML forum quite well. Whenever necessary, the SETU workgroups have provided feedback and input to the HR-XML consortium in order to gather support for changes in the base standard. Meanwhile and awaiting approval and adaptation, these feedback elements were put in temporary profiles and used test cases in a local Dutch setting. Examples include e.g. changes to the representation of allowances on a timecard. Elements that were considered local have successfully been developed into profiles, in concordance with the profiling guidelines of HR-XML. The use of a chamber of commerce reference number on an invoice is an example of such an extension.

4. CONCLUSIONS

This paper introduced a model for strategies related to the use of international standards within a specific context. This model was evaluated in a case study for the Dutch temporary staffing industry. The model can be improved in an iterative way by using more case studies to adapt the model. More research is required with respect to the use of the model; the pros and cons of each strategy, the situational dependencies of selecting the appropriate strategy, etc.

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